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Cascina Costa, June 20, 2003

Docket Management System,
U.S. Department of Transportation,
Room PL401,
400 Seventh Street, SW.,
Washington, DC 20590-0001
USA

COMMENTS ON FAA 14 CFR PART 93
Noise Limitations for Aircraft Operations in the Vicinity of Grand Canyon National Park;
Proposed Rule

Dear Sirs,

Docket Number FAA-2003-14715

The comments given below describe AgustaWestland concerns about the so-called *Quiet Technology Designation* (QTD) described in the Supplemental Notice of Proposed Rulemaking 'Noise Limitations for Aircraft Operations in the Vicinity of the Grand Canyon Nation Park; Proposed Rule' issued by the FAA on 24 March 2003. It should be noted that the objections to the current proposals are not about the desire to control aircraft noise in the Grand Canyon National Park. Our concern arises from the use of a prescribed relationship between noise level and passenger capacity to classify whether or not low noise technology has been utilised in a specific aircraft design.

Appendix A to Part 93 - GCNP Aircraft Quiet Technology Designation defines a *Quiet Technology Designator* for commercial aircraft operating in Grand Canyon National Park under 14 CFR 93.01. The appendix contains procedures for determining the quiet technology status of aircraft for each aircraft determined during the noise certification process. For helicopters certificated in accordance with FAR 36 Appendix H, the QTD limit expressed in EPNdB is given by the expression:

$$\mathbf{EPNL(H) = 80 + 10\ Log_{10}(PAX/2)\ EPNdB}$$

Evaluating this expression for the EH101-510 gives $80 + 10\ Log_{10}(30/2) = 91.8$ EPNdB. The actual certificated noise level for this aircraft is 93.6 EPNdB, i.e. 1.8 EPNdB *above* the QTD criterion. Thus, despite the deliberate and focused application of all available technology to reduce noise and notwithstanding the significant (7.0 EPNdB) margin of compliance with the certification flyover noise limit (100.6 EPNdB), the aircraft is classified under the QTD concept as NOT having quiet technology. In this respect the proposed limit fails to properly distinguish between those helicopters incorporating best acoustic practice and those designed with less regard to environmental impact.

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Although the noise certification limits are based on all up weight (AUW) the FAA QTD does not make any reference to this parameter. However, well-established theoretical analysis shows that rotor noise levels increase as AUW^2. Consequently, helicopter noise must increase by at least 20 $Log_{10}(AUW)$ unless other measures are taken to offset the effects of AUW. In fact, examination of the QTD formula reveals an interesting implied relationship between noise level, passenger seat capacity and AUW that may be illustrated using EH101, EC135 and S-92A helicopters.

The QTD level for the 6 passenger EC135 P1 is 84.8 EPNdB. The certificated flyover noise level of this aircraft is 84.0 EPNdB thus meeting the FAA QTD criterion. The corresponding margin of compliance with the Appendix H noise limit (93.5 EPNdB) is 9.5 EPNdB. This is one of the highest margins to date, demonstrating the low noise characteristics of the aircraft. However, if the EC135 noise level is adjusted to the same AUW as the EH101 using the proper AUW^2 relationship, the scaled noise level is 98.2 EPNdB. This is 4.6 EPNdB *higher* than the figure actually demonstrated by the larger, more capable EH101. In this respect it is reasonable to argue that in terms of noise reduction technology the EH101 is significantly more effective than the EC135.

Comparisons with the recently certificated S-92A also serve to illustrate the success of the noise reduction measures applied to EH101. The difference in AUW (32188 pounds *cf* 26150 pounds) suggests the EH101 should generate noise levels 1.8 EPNdB higher than the S-92A. However, the certificated flyover noise level is actually 3.6 EPNdB *lower* than that demonstrated by the S-92A. Thus, taking into account the difference in AUW, the noise reduction measures applied to EH101 are 5.4 EPNdB more effective than those employed on the S-92A.

On the basis of these comparisons with contemporary designs of widely different AUW, it is entirely unreasonable for the EH101 to be classified non-compliant against a limit described as *Quiet Technology Designator*. This specific example serves to illustrate the more general failing of the proposed rule. The fundamental problem with the QTD in current form is that it is based on a prescribed relationship between noise level and passenger seat numbers. In fact there is no *direct*, physically meaningful relationship between seat capacity and noise level. For a given level of technology, noise naturally increases with AUW. However, a noise limit based on an assumed linkage between seat number and noise fails to account for differences in AUW due to structural weight, number of engines and fuel capacity etc. none of which has any bearing on the level of noise suppression employed.

Yours faithfully,

For and on behalf of:

AGUSTA S.p.A.
VICE PRESIDENT ENGINEERING
Pietro Alli